

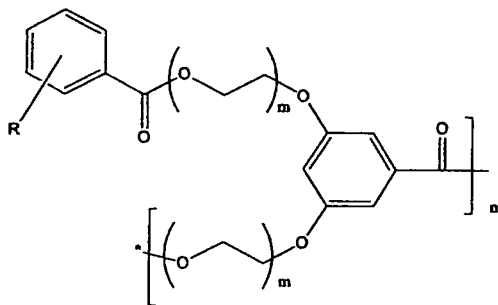
Scope of patent claims

(Claim 1) A solid-state polymer electrolyte membrane, characterized in:

that a primary constituent of which is a hyperbranched polymer having an acidic functional group disposed at a terminal of a side chain thereof.

(Claim 2) A solid-state polymer electrolyte membrane according to claim 1, characterized in:

that the hyperbranched polymer having an acidic functional group disposed at the terminal of the side chain thereof is a poly (bis(oligo-ethylene glycol) benzoate) expressed by general formula 1 below.



...(general formula 1)

(Claim 3) A solid-state polymer electrolyte membrane according to claim 1 or claim 2, characterized in:

that the poly (bis(oligo-ethylene glycol) benzoate) is a polymer having a dendritic structure, which is obtained by polymerizing an A₂B-type monomer synthesized from an oligo-ethylene oxide chain expressed by (CH₂CH₂O)_m (m = 1 to 6) and dioxybenzoate.

(Claim 4) A solid-state polymer electrolyte membrane, characterized in:

that a primary constituent of which is a mixture of a hyperbranched polymer having an acidic functional group disposed at

a terminal of the side chain thereof and a bridged polymer having a network structure.

(Claim 5) A method for manufacturing a solid-state polymer electrolyte membrane, comprising:

a first step in which poly (bis(oligo-ethylene glycol) benzoate) is synthesized by polymerizing an A2B-type monomer synthesized from an oligo-ethylene oxide chain expressed by $(\text{CH}_2\text{CH}_2\text{O})_m$ ($m = 1$ to 6) and dioxybenzoate; and

a second step in which an acidic functional group is introduced at a terminal of a side chain of the poly (bis(oligo-ethylene glycol) benzoate).

(Claim 6) A method for manufacturing a solid-state polymer electrolyte membrane according to claim 5, characterized in:

that in the second step, the acidic functional group is introduced at the terminal of the side chain by first esterifying the terminal of the side chain with alkaline metallic salt of an o-, m- or p-sulfobenzoic acid or a disulfobenzoic acid.

(Claim 7) A method for manufacturing a solid-state polymer electrolyte membrane according to claim 5, characterized in:

that in the second step the acidic functional group is introduced the terminal of the side chain by first esterifying the terminal of the side chain with a benzoic acid compound having as a functional group thereof phosphoric acid or phosphonic acid ester and converting the terminal of the side chain to an acidic functional group through hydrolysis of phosphoric acid ester or phosphonic acid ester obtained by the first esterifying.

(Claim 8) A solid-state polymer electrolyte fuel cell, comprising a solid-state polymer electrolyte membrane according to any of claims 1 through 4.

(Amendment in compliance with article 19)